

Tactical Nuclear Weapons: Debunking the Mythology

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INSS Occasional Paper 46

August 2002

USAF Institute for National Security Studies
USAF Academy, Colorado

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE AUG 2002		2. REPORT TYPE		3. DATES COVERED -	
4. TITLE AND SUBTITLE Tactical Nuclear Weapons: Debunking the Mythology				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) USAF Institute for National Security Studies,USAF Academy,CO,80840				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES The original document contains color images.					
14. ABSTRACT see report					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 42	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

The views expressed in this paper are those of the author and do not necessarily reflect the official policy or position of the Department of the Air Force, the Department of Defense, or the US Government. The paper is approved for public release; distribution is unlimited.

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TABLE OF CONTENTS

Foreword	vii
Executive Summary	ix
Introduction: The Definition Problem and <i>Tactical</i> Nuclear Weapons	1
What is a <i>Tactical</i> Nuclear Weapon?	1
Taking a Step Back: Hiroshima and Nagasaki	3
The Limitations of Arms Control	4
The New Deterrence Requirements	6
The Historical Context of <i>Tactical</i> Nuclear Weapons	8
Nuclear Weapons and the Transatlantic Link	8
<i>Tactical</i> Nuclear Weapons and the Triad	10
Unilateral Initiatives and the New Environment	10
Concerns about Russian Nuclear Weapon Security	12
The Nature of the Russian Problem	12
Recent Developments and Proliferation Concerns	13
The Future: Taking “Tactical” Out of the Discussion	15
Finding #1	16
Finding #2	18
Finding #3	21
Finding #4	23
Notes	26

FOREWORD

We are pleased to publish this forty-sixth volume in the *Occasional Paper* series of the United States Air Force Institute for National Security Studies (INSS). This paper is a capstone document on two levels. First, it is a linked follow-on to Steve Lambert's (with Dave Miller) *Russia's Crumbling Tactical Nuclear Weapons Complex: An Opportunity for Arms Control* (INSS Occasional Paper 12, April 1997). That paper was derived from their Naval Postgraduate School thesis, and it was selected for the award of the INSS Linhard Outstanding Researcher Award. Second, this current paper also caps a remarkable series of closely related research by the team of John Cappello, Gwen Hall, and Steve Lambert. They previously wrote *A Post-Cold War Nuclear Strategy Model* (INSS Occasional Paper 20, July 1998—also a Linhard Award winner); "US Counter-proliferation Strategy for a New Century" (in *Searching for National Security in an NBC World*, INSS July 2000); and "Triad 2025: The Evolution of a New Strategic Force Posture" (in *Nuclear Deterrence and Defense: Strategic Considerations*, February 2001; a version was also published under that same title in *National Security Studies Quarterly*, Spring 2001). This paper brings both tracks full circle back to "tactical" nuclear weapons. While this topic is addressed in much more exhausting detail in Jeffrey A. Larsen and Kurt J. Klingenberg, eds. *Controlling Non-Strategic Nuclear Weapons: Obstacles and Opportunities* (INSS, July 2001), this paper offers a concise summary of many of the difficult issues presented in addressing this category of weapons within nuclear policy and posture, and particularly within the arms control arena. Its four direct findings are worthy of full consideration and debate as we rethink the place and role of tactical nuclear weapons.

About the Institute

INSS is primarily sponsored by the National Security Policy Division, Nuclear and Counterproliferation Directorate, Headquarters US Air Force (HQ USAF/XONP) and the Dean of the Faculty, USAF Academy. Our other sponsors include the Secretary of Defense's Office of Net Assessment (OSD/NA); the Defense Threat Reduction Agency; the Air Staff's Intelligence, Surveillance, and Reconnaissance Directorate (XOI) and the Air Force's 39th and 23rd Information Operations Squadrons; the Army Environmental Policy Institute; and the Air Force Long-Range Plans Directorate

(XPXP). The research leading to the papers in this volume was sponsored by OSD/NA, DTRA, and XONP. The mission of the Institute is “to promote national security research for the Department of Defense within the military academic community, and to support national security education.” Its research focuses on the areas of greatest interest to our organizational sponsors: arms control and strategic security; counterproliferation, force protection, and homeland security; air and space issues and planning; information operations and information warfare; and regional and emerging national security issues.

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JAMES M. SMITH
Director

TACTICAL NUCLEAR WEAPONS: DEBUNKING THE MYTHOLOGY

EXECUTIVE SUMMARY

This paper closes out a series of projects already completed by the authors to review nuclear weapons and deterrence strategy in the post-Cold War world. Previous research addressed the overall numbers of nuclear forces, deterring chemical and biological threats, and incorporating national and missile defenses. In this project, the authors acknowledge the special psychological properties of nuclear weapons (regardless of yield and range) and the fact that detonation of any nuclear weapon, to include a tactical nuclear weapon, would be a “strategic” event. The paper reviews the many concerns attached to tactical nuclear systems over time, to include recent concerns about security surrounding the Russian stockpile. Given all these issues, the authors propose that tactical nuclear forces be seen in the context of current and future security needs, and that the US not limit its own security needs because of problems with the Russian arsenal.

A recommendation to integrate all nuclear weapons into the US nuclear framework is made to enhance deterrence and provide a credible response to a variety of threats to US interests, and to continue the critical trans-Atlantic link between the US and NATO. This accepts both the military and political value of nuclear weapons without distinguishing between them because of yield, range, target effect, delivery vehicles, or deployment location. This is especially important in an environment of declining numbers of strategic nuclear systems and the incorporation of missile defenses. Recent events have demonstrated the difficulty of formal arms control agreements aimed at strategic systems and circumstances of the past and the need to address future threats and situations. Further, the Bush administration’s reaction to the ABM Treaty, particularly the rationale provided, suggests that bilateral arms control initiatives will not be as successful in the future as they were during the Cold War.

The paper concludes with four findings recommending that US nuclear strategy evolve to include all nuclear systems so they are part of a comprehensive nuclear posture. The first finding acknowledges the lack of Russian incentive to engage in traditional arms control negotiations in any nuclear weapons category other than those in the strategic arena. This is primarily due to

weaknesses in Russian conventional forces. Second, even if the Russians were motivated to do so, it is not in the interest of the US or its allies to become entangled in further agreements on systems not previously captured in other treaties. This is the view of the current administration. Third, because of the first two findings it is clear that for the future, other engagements aside from traditional arms control measures, should be the solution for dealing with the Russian “problem.” And finally, though historically tactical nuclear systems have not been discussed when talking about the US nuclear arsenal, the US can enhance deterrence by integrating all US nuclear weapons into a comprehensive nuclear posture.

Tactical Nuclear Weapons: Debunking the Mythology

“one cannot fashion a credible deterrent out of an incredible action.”¹

INTRODUCTION: THE DEFINITION PROBLEM AND *TACTICAL* NUCLEAR WEAPONS

What is a *Tactical* Nuclear Weapon?

The very question brings forth a conundrum of difficult and challenging issues--directly related to security strategy, doctrine, and arms control. A brief survey of respected and knowledgeable experts in the field of nuclear and defense policy reveals the depth and breadth of the definitional problem. According to some of these academics and officials, a “tactical” nuclear weapon is

- *a nuclear weapon used on the battlefield*²
- *any nuclear weapon not limited or captured by SALT and START counting rules*³
- *any nuclear weapon delivered by shorter range systems*⁴
- *a nuclear weapon used in a regional contingency or deployed to strengthen deterrence in a regional contingency—essentially weapons deployed overseas to meet a step in the escalation ladder*⁵
- *all nuclear weapons not limited by the START negotiations*⁶
- *a nuclear weapon with operational military war-fighting capabilities*⁷
- *a weapon that can be used with strategic effect, and has relatively long range and identical or similar capabilities [to strategic weapons]*⁸

The typical array of potential characteristics tends to include range, yield, target effect, delivery vehicle, deployment location, or a definition based on an exclusion from other classes or weapons types. In addition, numerous labels associated with these types of nuclear weapons have proliferated throughout the literature. According to one recent analysis, besides the term “tactical,” these systems have also been described as non-strategic nuclear forces (NSNF), intermediate-range nuclear forces (INF), shorter-range or short-range, battlefield, theater, or sub-strategic nuclear weapons.⁹ With regard to the word “tactical,” it seems that two meanings have developed in the course of the nuclear age. On the one hand, “tactical” relates to range—its origins are in the theories articulated by the inter-war strategic airpower thinkers—this being the predominant viewpoint used during the Cold War to distinguish between “tactical” and “strategic” systems.¹⁰ The second meaning of “tactical” seems to relate to function, the manner in which the employment of such a weapon affects the course of events on the battlefield—this being the classical understanding of the term “tactical.”¹¹

However, can a nuclear weapon even be considered in a “tactical” or theater-level sense, especially given the immense political and strategic pressures that would inevitably follow the detonation of such a weapon? During the Cold War, “tactical” or sub-strategic nuclear weapons were developed and produced by both sides in mass quantities, and included air-delivered gravity bombs. That the latter, in particular, should be labeled as a “tactical” weapon is somewhat dubious. A nuclear gravity bomb that is delivered from a bomber or fighter-bomber platform from thousands of miles away (with limited warning) is more of an

offensive, deep-strike, strategic system than a “tactical” weapon. In many ways, the entire class of “tactical” nuclear weapons runs into a doctrinal malaise. In a real sense, it is the effect—both militarily on the target, and politically on the system—that should define the class of weapon or employment. Many would argue that a nuclear detonation is a strategic event, politically and militarily, regardless of the yield or the delivery means.

Taking A Step Back: Hiroshima and Nagasaki

In order to fully exploit this argument, it would be helpful to take a step back and briefly review the only historical example of an actual nuclear use during wartime. More often than not, the discussion relating to “tactical” nuclear weapons tends to be ensnared in the day-to-day technical debates regarding arms control, deterrence strategy, or targeting policy. Decision makers, academics, and military planners alike lose sight of the immense capabilities of the weapons they are theorizing about. After all, both atomic weapons dropped on Japan during World War II were below 20 kilotons in their explosive power. Most today would consider that a relatively low-yield “tactical” weapon.

On the sixth of August, 1945, the *Enola Gay*, an American B-29 bomber, flew over the city of Hiroshima and dropped a lone bomb named Little Boy.

[The explosion] created a fireball 18,000 feet in diameter. Near the center, people became nothing; within nine seconds, 100,000 people were killed or fatally injured. Two hours later, drops of black rain the size of marbles began to fall on the city. . . . Shadows of Hiroshima’s citizens were burned onto sidewalks and on the sides of buildings. Patterns of victim’s clothes were burned into their skin. . . . On the twelfth day after Hiroshima was bombed . . . the survivors’ wounds began to open. On the fourteenth day, hair began to fall from their heads. Skin

came off in patches; there was vomiting, diarrhea, bleeding from gums, and nausea.¹²

Significantly, in one spectacular instant, all key functions of municipal agencies, all means of defense, relief, medical care, police protection, and firefighting, were destroyed or thrown into confusion.¹³ Because of the immense disorder surrounding the city after the bombing, it is impossible to know exactly how many people were directly effected, but most moderate estimates conclude that around 130,000 people died within three months of the explosion.¹⁴ As Thomas Schelling concluded in *Arms and Influence*, Hiroshima and Nagasaki were “weapons of terror and shock. They hurt, and promised more hurt, and that was their purpose. The few ‘small’ weapons we had were undoubtedly of some direct military value, but their enormous advantage was in pure violence.”¹⁵ These weapons were, as Schelling noted, “in the tradition of Sheridan against the Comanches and Sherman in Georgia.”¹⁶ The point is that even a so-called “tactical” 20 kiloton nuclear weapon is capable of dramatic shock and destruction—and the efficacy of deterrence relies on signaling that message.

The Limitations of Arms Control

It is unfortunate that the dynamic of arms control—and its requirement to categorize and sometimes artificially label weapons in order to simply allow counting their numbers—has removed an awareness of the immense destructive fire power of each “tactical” nuclear weapon. While battlefield effects may vary based on the yields of various nuclear weapons, it is not tautological to state that a “nuclear weapon remains a nuclear weapon.” To attempt to classify the extremely large number of “tactical” weapons not limited by previous arms control arrangements leads to several

negative consequences. First, it reduces the discussion to a fruitless effort to categorize warheads or weapons that have thus far presented no productive way of being classified—due in large part to their great diversity, quantity, and the secrecy with which they are held. Second, it fundamentally ignores the *strategic effect* and *political consequences* that the future employment of any nuclear weapon will invariably have. Third, it reduces the overarching impact of nuclear deterrence by implying that the category of nuclear weapons artificially dubbed as “tactical” are somehow more “usable” or “less destructive” than other nuclear weapons. While a 20 kiloton yield may be mathematically smaller than a one megaton yield, the destructive firepower of the smaller nuclear weapon remains so far above the conventional threshold that it still retains a dramatic qualitative and quantitative difference in physical damage and human casualty potential. Fourth, it ignores, and possibly diminishes, the fundamental psychological element of nuclear weapons—that part of the nuclear equation that promises to inflict unimaginable terror, shock, and destruction on the enemy.

Future discussions regarding national security, deterrence strategy, targeting policy, employment doctrine, or arms control should instead simply refer to *nuclear weapons* and *non-nuclear weapons*. As Ambassador Robert Joseph has aptly stated, “we must not make this more difficult than it is. Not every element of this complex security environment is complex. In fact, some things are clear. This is the case with TNF, where old arms control notions—perhaps jazzed-up somewhat—represent nothing more than a problem masquerading as a solution.”¹⁷ According to Dr. Keith Payne at the National Institute for Public Policy, the clear-cut distinction between *nuclear* vis-à-vis *non-nuclear* weapons

underscores their value to deterrence in the mind of national political leaders: The difference between the two is stark and definitive and thereby serves to enhance nuclear impact throughout the deterrence spectrum. It avoids a graying of deterrence, and simplifies or sharpens the deterrence discussion.¹⁸

The New Deterrence Requirements

The United States should be prepared to engage and move forward in this area. This paper closes out a series of projects completed by the authors directly engaging nuclear weapons and deterrence strategy in the post-Cold War world. By means of a brief review, our previous work has concluded that while the concept of deterrence is not in danger, it will not require the same number of weapons or even the same weapons mix that was deemed necessary during the Cold War. In fact, deterrence must continue to evolve, as traditional deterrence by punishment may not be credible nor militarily effective against the many Tier II threats armed with chemical or biological weapons capabilities. Concern about these threats has been heightened since the September 11, 2001 terrorist attacks on the US.

In order to address these Tier II threats, defenses will need to become an integral part of a new approach to deterrence and its required force posture.¹⁹ Defenses can indeed be vitally synergistic within a comprehensive deterrence and counter-proliferation strategy. Our most recent work suggested a New Logic with which to proceed in today's multi-polar security environment.²⁰ It put forth an intellectual framework, and created a new mix of offensive nuclear and defensive forces which effectively suppress the capabilities of Tier II states with smaller NBC forces, while preserving robust deterrence vis-à-vis the primary Tier I states, the

Russian Federation and China. It called for an evolution of deterrence strategy away from *mutual vulnerability* toward *protection and assurance*. This last project concluded that, over time, the New Logic might begin to de-escalate the historical search for security based on higher numbers of nuclear weapons. These results from prior research led us toward this new effort, an attempt to integrate all nuclear weapons into the framework in order to enhance deterrence and to provide a credible response to a variety of threats to US interests. An adversary has to believe that you could and would use a particular nuclear response. This is the essence of deterrence. Therefore, you need a range of credible responses to engage a variety of threats.

Looking at “tactical” nuclear forces in the context of former security needs and circumstances does not allow for a thorough or even useful examination of these weapon systems. Current and future security needs should be the guide to how all nuclear weapons are considered within US national security policy. While there is a legitimate concern about the Russian tactical nuclear arsenal, leading arms control enthusiasts to focus on these weapons, the US should not limit its own security needs because Russia has a problem with its arsenal. To do so could result in the US losing its military flexibility and its political-military link to its European allies. As Dr. David Kay, the former UNSCOM inspector in Iraq has stated, “do not treat the hemorrhaging of the old Soviet stockpile of weapons and technology as an arms control issue. It is essential that . . . [we] clearly lay before the Russians the choice we face. Unless Russia itself brings order and control over its storehouse of weapons of mass destruction, the US and others will have no choice but to undertake greater defensive measure to

protect themselves against the certainty that these weapons will fall into the hands of dangerous states and groups.”²¹

This paper examines the historical context in which “tactical” nuclear weapons have been considered, including the transatlantic linkage to NATO, their place within the US nuclear arsenal, and recent unilateral initiatives by the US and Russia. It then briefly reviews Russia’s stockpile management issues, to include recent transparency regimes and bilateral cooperation attempts. The paper concludes with four findings that ultimately recommend that US nuclear strategy evolve to include all nuclear systems. Accordingly, all US nuclear weapons should become part of a comprehensive nuclear posture.*

THE HISTORICAL CONTEXT OF *TACTICAL* NUCLEAR WEAPONS

Nuclear Weapons and the Transatlantic Link

Much has been written about “tactical” nuclear weapons, both positive and negative, since they became part of the US-NATO relationship. In 1953, the US offered NATO small yield and short-range tactical nuclear weapons as a means to provide firepower with less manpower.²² Support for these weapons, though expressed in public less frequently than in the past, continues through today. US nuclear weapons deployed in Europe have been cited for their benefits in sustaining the transatlantic link between the US and its NATO allies, as an obvious deterrent to weapons of mass

* This paper is constrained, by historical necessity, to use a variety of names (tactical, non-strategic, TNF, NSNF, etc.) to refer to these weapons. Though less than desirable, this definitional confusion persists through the current context. As previously mentioned, one of the findings by the authors is to recommend a change in terminology simply to nuclear and non-nuclear weapons.

destruction held by an adversary, and as a possible deterrent to aggression by Tier II states.²³

As Jeffrey Larson states in a recently published comprehensive review of non-strategic nuclear weapons and the problems associated with them, these weapons were an integral part of NATO's triad of conventional forces, tactical nuclear weapons in theater, and US, British, and French strategic systems.²⁴ That book's authors note what most accept as gospel: these non-strategic weapons are part of the transatlantic link to the US. The US now has an arsenal of about 1,300 gravity bombs delivered by tactical aircraft, and about 320 nuclear Tomahawk Land Attack Missiles (TLAM-N) delivered by submarine.²⁵ According to the Natural Resources Defense Council, 150 tactical nuclear weapons are deployed at 10 bases in seven European nations.²⁶

Though some believe that there is little military rationale for these weapons, they continue to play an important symbolic and political role.²⁷ "A survey by the Atlantic Council of the United States in the mid-1990s observed that the overwhelming consensus among political leaders and strategic thinkers in Europe was that it is premature to address major changes in future nuclear force postures."²⁸ From this one can conclude that at least in this public context, there is no interest among the European allies to reduce or eliminate US non-strategic nuclear weapons. The 1999 NATO New Strategic Concept states that "The fundamental purpose of the nuclear forces of the Allies is political: to preserve peace and prevent coercion of any kind of war. They will continue to fulfill an essential role by ensuring uncertainty in the mind of the aggressor about the nature of the Allies' response to military aggression."²⁹ Furthermore, the Concept states that European sub-strategic nuclear

forces “provide an essential link with strategic nuclear forces, reinforcing the transatlantic link.”³⁰

Tactical Nuclear Weapons and the Triad

Historically, tactical nuclear weapons have not been discussed when talking about the US nuclear arsenal, the US Triad does not incorporate non-strategic nuclear forces, and only some are integrated into the SIOP. Traditionally, non-strategic nuclear weapons were distinguished in terms of yield and range. One reason for the many categories and classifications of nuclear weapons was the need to count those weapons so as to arrive at some perceived level of parity that gave the US and the Soviet Union/Russia a feeling of stability. Though, in the past, they had much smaller yields than strategic weapons, “considerable overlap currently exists in the yields of strategic and non-strategic nuclear weapons.”³¹ As Andrea Gabbitas notes, US non-strategic nuclear weapons have yields as high as 170 kilotons and Russia has yields up to one megaton.³² Regardless of yield, nuclear weapons have a psychological property not found in other weapon systems. And because of their “special nature” the authors of this study agree with Linton Brooks’ assertion that “by any rational definition, all nuclear weapons are strategic.”³³

Unilateral Initiatives and the New Environment

Some argue that tactical nuclear weapons are more trouble than they are worth; thus, they are suitable candidates for arms control initiatives leading to drastic reductions or elimination. In June 1991, President Bush ordered the military to unilaterally cut its arsenal of non-strategic nuclear weapons, though some still remain in Europe. All nuclear weapons, including TLAM-Ns, were removed from surface ships and stored ashore, though they can still

be deployed on submarines.³⁴ Between 1991 and 1993 US tactical nuclear weapons were reduced by 85 percent, and related weapons storage sites were reduced by more than 80 percent.³⁵

In 1997 Presidents Bill Clinton and Boris Yeltsin agreed that tactical nuclear weapons would be included in the strategic arms limitations talks.³⁶ This did not happen. Tactical nuclear weapons are said to have lost prominence in Air Force planning, and plans to use them may expire when the F-15, F-16, and F-117 are retired from service (there are no plans to integrate them aboard the F-22).³⁷ The Army is out of the tactical nuclear weapons business, and the Navy's tactical nuclear Tomahawk cruise missiles are not carried aboard Navy vessels. The B-61 nuclear gravity bomb is presently the only "tactical" nuclear weapon deployed by DoD.³⁸

As a result, some policy makers are concerned about the US being at a possible strategic disadvantage if there are deep reductions in strategic arsenals and the Russians maintain their numerical advantage in non-strategic nuclear weapons. Also, there has been concern in some quarters that Russia might withdraw from Intermediate- and Shorter-Range Nuclear Forces arms control agreements as well as the START II treaty as the US abrogates the ABM Treaty.³⁹ In December 2001 President Bush announced that the US would withdraw from this treaty. It is unclear how the recent cooperation between the US and Russia in combating terrorism might lessen these concerns.

There seems to be an implicit assumption among some in the policy community that since the US reduced its non-strategic arsenal—and the Russians have many more of these weapons than the US—there is an automatic requirement for binding negotiations to reduce the Russian arsenal, especially given Russia's apparent

problems in securing it. The same people tend to believe that arms control measures can fix these “problems.” Condoleezza Rice’s recent comments about arms control’s usefulness in making strategic nuclear weapons cuts are relevant to this discussion about tactical nuclear systems. Dr. Rice said that the Bush administration believes that “the old arms control agreements in which you match warhead for warhead, system for system, ignoring geography, ignoring history, ignoring threats around you, was the old way of thinking about this.”⁴⁰

CONCERNS ABOUT RUSSIAN NUCLEAR WEAPONS SECURITY

The Nature of the Russian Problem

The US has been actively engaged in attempts to help the Russians secure their nuclear weapons arsenal. These efforts include: helping to ensure reliable command and control; decreasing the vulnerability to theft of nuclear stockpiles; enhancing the safety of nuclear facilities and weapons grade material; improving verification procedures; and curbing the diffusion of nuclear-related technologies and equipment.⁴¹ A bipartisan panel report to the Secretary of Energy concludes that uncontrolled nuclear weapons material in the former Soviet Union is “the most urgent unmet national security threat to the United States today.”⁴²

Previous work by the authors has analyzed the nature of Russian woes in this area, to include (1) physical and technical security challenges, (2) operational doctrine including pre-delegation and de-escalation, (3) nuclear dependency in the face of conventional force degradation, (4) considerable shortcomings in stockpile consolidation and stewardship efforts, and (5) challenges with demoralized personnel and resultant internal security

problems.⁴³ Assuming that either Russia and/or the United States were to engage on this issue, there remain tremendous potential difficulties including (1) initial declarations and accuracy in original base-line warhead numbers, (2) the detection of non-declared warheads and the presence of intrusive monitoring regimes, and (3) the verified elimination of warheads that have been previously declared. Additionally, what are the ramifications of actually counting warheads and which ones will be accountable and/or considered operational and which ones will be considered “on reserve?”

The Nunn-Lugar program, formally known as the Cooperative Threat Reduction Act, was passed in January 1991. Through it and similar efforts, the US spends about \$700 million per year to help secure the Russian arsenal. In January 2001, the Baker-Cutler task force recommended that the US spend up to \$30 billion over the next eight to ten years to improve Russian nuclear stockpile security.⁴⁴ Secretary of Defense Donald Rumsfeld is reviewing the CTR program and its benefits. He indicated that, “We would not want the US investment in the CTR program to become the means by which Russia frees up resources to finance its military modernization programs.”⁴⁵

Recent Deployment and Proliferation Concerns

There were reports in January 2001 that in June of the previous year Russia moved tactical nuclear weapons to Kaliningrad, a military base in Eastern Europe, possibly in response to NATO expansion and to compensate for Russia’s crumbling conventional military forces.⁴⁶ Nevertheless, a Russian Foreign Ministry spokesman automatically disputed such reports saying that none of the Baltic Fleet’s forces located in Kaliningrad “has ever had any

tactical nuclear weapons.”⁴⁷ Concerns about Russian placement of non-strategic nuclear weapons in Kaliningrad continue to motivate arms control enthusiasts to find ways to reduce the Russian stockpile, if not eliminate it entirely. And there are concerns about Russian initiatives to develop new “pin point” tactical nuclear weapons to compensate for its conventional forces’ shortcomings.⁴⁸

The recent terrorist attacks on US soil have raised considerable attention and discussion about whether or not terrorists have been successful in obtaining Russian nuclear material and weapons. It was recently reported in the *Wall Street Journal* that a Russian three-star general told reporters that terrorists had attempted to penetrate Russia’s nuclear weapons facilities.⁴⁹ The chief of the Russian Defense Ministry said there were two attempts by terrorists to penetrate Russian nuclear storage facilities.⁵⁰ And it is thought that the Osama bin Laden’s Al Qaeda network has tried to buy nuclear material stolen from the former Soviet states.⁵¹

Notwithstanding these concerns, a singular focus on problems with the Russian arsenal detracts from a more proper focus on US security interests and what these interests require in terms of maintaining a credible deterrence posture. For example, there have been suggestions that the US alter its deployment posture by centralizing its non-strategic nuclear forces in a limited number of storage sites, with the Russians doing the same. One motivation for this proposal is concern about Russian control over its nuclear warheads.⁵² But, this centralized approach would limit US flexibility to both deter and retaliate if necessary.⁵³ Furthermore, the so-called cantonment of warheads dramatically increases their vulnerability, making them susceptible to sabotage and preemption.

Though wanting to influence the Russian non-strategic arsenal and its policies about its use are desirable goals, especially in attempting to create a more secure environment for what many consider to be a troublesome weapons category, the US should first consider its own security needs. The US should posture those needs in the most advantageous way—militarily, to engage emerging threats and politically, to enhance its alliance relationships.

THE FUTURE: TAKING “TACTICAL” OUT OF THE DISCUSSION

Much of the definitional malaise involving so-called tactical nuclear weapons resulted from the Cold War requirement to either (1) purposefully exclude these systems from arms control regimes or (2) ultimately include them in some type of arms control agenda in the future. Therefore, any future progress in dealing with these weapons must be disconnected from previous Cold War arms control logic. Arms control no longer holds the promise that it was once thought to have in this arena. Indeed, traditional arms control has only a limited ability to capture this highly diverse and multi-dimensional class of weaponry. Instead of an approach based on arms control, the authors of this paper advance the following findings:

- ▶ There is little incentive for the Russians to engage in traditional arms control in nuclear weaponry outside of previous strategic protocols.
- ▶ It is not in the interest of the United States or its allies to entangle themselves in further agreements that affect nuclear weapons not previously captured in other treaties.

- ▶ The prescription for the future involves seeking engagement through other means aside from traditional arms control venues.
- ▶ The US should enhance deterrence by integrating all nuclear weapons into a comprehensive nuclear posture.

Finding #1: There is little incentive for the Russians to engage in traditional arms control in nuclear weaponry outside of previous strategic protocols. The Russians have little incentive to meet the United States at the arms control table in this area. In a recent study, Dr. David Yost explains four primary reasons why the Russians are unlikely to agree to engage in discussions regarding reductions in tactical nuclear weapons, much less codify them in a formalized agreement. “The first is Russia’s conventional military weakness. This weakness is largely a function of the country’s economic problems, which are unlikely to be overcome for many years.”⁵⁴ According to Yost, the second reason involves NATO’s conventional military superiority. “While Russian analysts include China and other potential non-Western adversaries in their assessment of NSNF requirements, in Russian eyes the Atlantic alliance’s military posture currently towers above all other security threats.”⁵⁵ Alexei Arbatov, the vice chairman of the defense committee of the Duma, stated the following in a July 2000 paper:

During the next 10 years, in addition to holding superiority in Europe of approximately 2:1, or even 3:1, NATO will also possess a substantial nuclear superiority. . . . However, due to the failures of Russian military reform from 1992-1997 and chronic underfunding of Russian defense from 1998-1999 (in constant prices, during these 3 years, the military budget has fallen by 50 per cent), qualitative factors (training, combat readiness, command and control, troop morale, and technical sophistication of weapons and equipment, etc.) are presently even more

favorable to NATO than pure numerical ratios might indicate.⁵⁶

Thirdly, Russia justifies its nuclear forces by looking beyond NATO's capabilities to its perceived intentions. NATO's operations in Kosovo and the former Yugoslavia significantly impacted the perceptions of Russian defense officials and military planners. The Russian defense minister, Igor Sergeev, indicated that

The fullest and most graphic significance of these threats to Russia's national security manifested itself in the course of NATO's expansion to the East and their aggression against Yugoslavia. . . . From a military-political point of view, this war signified, in essence, the beginning of a new era of not just military, but also general history. An era of the open, military-force dictate of the US in relation to other countries, to include its allies.⁵⁷

Finally, according to Yost, the "fourth reason for a low level of interest in NSNF arms control is that Russian military doctrine and policy assign several important functions to Russia's nuclear weapons and to NSNF in particular."⁵⁸ These functions are:

1. To deter external aggression.
2. To serve as an "equalizer" or "counter-balance" to the conventional force superiority of potential adversaries.
3. To help maintain the "combat stability" of forces engaged in an operation.
4. To make possible the "de-escalation" of conventional conflicts.
5. To make it possible for Russia to conduct limited nuclear strikes in a regional (or theater) war while avoiding an escalation to intercontinental nuclear operations or any other geographical extension of the conflict.

6. To inhibit the intervention of outside powers (such as the United States or NATO) in regional conflicts involving Russia.
7. To substitute for advanced, long-range, non-nuclear precision strike systems that, Russian authorities hold, “have begun to approach the role of nuclear weapons” in their significance.
8. To constitute assets for the high command to change the correlation of forces in specific theaters or sectors of military operations.
9. To compensate, at least to some extent, for reductions in Russia’s strategic nuclear forces.

59

In a general sense, the Russians tend to view “tactical” nuclear systems as weapons that have operational or military utility, i.e. war fighting value. They tend to view strategic systems as weapons that are used for political effects, i.e. the prevention of war and deterrence. Therefore, for the foreseeable future, and with no changes to the current economic forecast in Russia, there seems to be little likelihood for a Russian willingness to engage on this issue.

Finding #2: It is not in the interest of the United States or its allies to entangle itself in further agreements that affect nuclear weapons not previous captured in other treaties. The potential outcomes of any formalized regime with the Russians could prove to be quite costly to the United States and its allies. **First**, any future negotiation involving tactical nuclear weapons would invariably allow the Russians to build legitimacy to their 50 plus year claim to pressure the United States to remove its nuclear weapons from NATO Europe. Russian political maneuvering in this area may very well undercut NATO’s strategic posture, and

generate pressure to withdraw the remaining weapons deployed in Europe.

Second, initiating TNF arms control would likely further undercut domestic support for maintaining current US capabilities in this area.⁶⁰ It is also likely to constrain the present force structure, and limit future requirements for these types of weapons. One strategic concern is the debate about deterring Tier II states with weapons of mass destruction (chemical and biological weapons, and more recently radiological weapons). Even before the Gulf War, former Assistant Secretary of Defense Harold Smith identified the B-61 nuclear bomb as “a weapon of choice against the Libyan chemical weapons program.”⁶¹ Maynard Glitman notes that the NATO Alliance Strategic Concept acknowledges the usefulness of NATO’s conventional and nuclear forces as a deterrent to the use of NBC weapons and prevents their proliferation.⁶² More recently, terrorist attacks on the US in September 2001 and the anthrax scares soon thereafter raised this concern to new heights.

Dr. C. Paul Robinson, the director of Sandia National Laboratories, favors the US developing a new class of nuclear weapons that would deter small aggressors. Stephen Younger, the new head of DoD’s Threat Reduction Agency, has recommended smaller nuclear weapons as part of a “fundamental rethinking of the role of nuclear weapons.”⁶³ These weapons would be small, low-yield, satellite-guided, extremely accurate, and able to kill a state’s leadership and military without killing a lot of civilians.⁶⁴ This type of weapon would be used for destroying deeply buried bunkers. Advocates of this weapon say it will also allow the US to reduce its current stockpile of more powerful warheads.⁶⁵ There is some belief that a “new” nuclear weapon could lead to stockpile

reductions by permitting one to retire the “city-busters” in the current stockpile, and yield cost savings.⁶⁶

With appropriate planning and training dual capable systems could target much of the strategically relevant world. Thus the number and mix of dual-capable systems and theater nuclear forces the US and opponents maintain is likely to affect US “strategic” nuclear requirements. US strategic weapons requirements could, for example, decrease if the US possessed robust theater capabilities, just as Russia’s robust theater forces almost certainly ease its strategic force requirements.⁶⁷

Younger notes that while some precision-guided long-range conventional weapons might be able to take on some roles currently assigned to nuclear weapons, road mobile missiles carrying weapons of mass destruction may still require a nuclear weapon for assured destruction.⁶⁸ This would apply to other hard targets as well (e.g., missile silos, command and control). In addition, a low-yield nuclear weapon might be “more useful against lesser powers that may not be deterred by large nuclear weapons that cause massive collateral damage,” so their “increased probability of use would provide a greater deterrent.”⁶⁹ Though some argue that deploying a weapon of this type indicates a move towards a war-fighting doctrine, others believe it would enhance deterrence because high-yield weapons are considered to be self-detering in some cases.⁷⁰

Third, implementing an arms control regime in this sphere is, according to some, a prescription for paralysis. According to Ambassador Robert Joseph, “given the inherent monitoring and verification limitations that would be associated with theater [nuclear] forces—from production to destruction—the outcome would not lead to high confidence in compliance.”⁷¹ Dr. David Kay, the former chief UNSCOM’s inspector in Iraq, explains that in

a TNF regime, “you would need to have very high fidelity in verification, which is going to be very, very tough.” The obstacles to be confronted would include, but not be limited to, verification, command and control, diversity of weapon types and ranges, and the complexities inherent in dealing with dual-capable delivery systems. In addition, any TNF agreement would have to be global to be efficacious, thereby involving Russia, France, Great Britain, China, India, and Pakistan. It is unlikely that most, if not all, of these countries would be willing participants.

As Ambassador Joseph has pointed out, “it may well be that the greatest potential problems associated with theater nuclear forces are those that could result from pursuing TNF arms control, especially if pursued as an end in itself.”⁷²

Finding #3: The prescription for the future involves seeking engagement through other means aside from traditional arms control venues. Recent scholarship recognizes the search for solutions outside the boundaries of traditional arms control. “With the Cold War over and enthusiasm waning for negotiating new, formal arms control agreements involving complex monitoring and verification regimes, legally binding controls aimed specifically at NSNF do not seem to be technically or politically practical.”⁷³ Instead, the United States should (1) focus its efforts on establishing a cooperative environment that incorporates, to the greatest extent possible, multi-lateral transparency measures, while also (2) placing a premium on rigorous intelligence gathering.

There are numerous avenues for transparency measures. They include previously established programs such as the Cooperative Threat Reduction (CTR) program. Other promising approaches include nuclear warhead transparency regimes that might involve

stockpile stewardship, infrastructure, dismantlement, and fissile materials disposition monitoring exchanges. While these programs may not produce concretely measurable results or tangible verification regimes, they do encourage and promote some sense of international understanding and cooperation. Their utility ultimately rests, according to Dr. Yost, in their ability (1) to reassure Western publics in the place of, or as a substitute for, normal arms control; (2) to act as a contact builder with the Russian nuclear weapons community, and a direct financial support to Russian WMD experts, thereby moderating their need to seek employment in other less desirable places; (3) to represent official engagement between Russia the United States in the public eye; and (4) due to the financial aspects of the programs, they have a definitive attraction for the Russians.⁷⁴

This type of engagement will require the United States to remain vigilant and to continually assess the situation through various intelligence gathering and analysis efforts. To lend some focus to the problem at hand, the United States should concentrate on the most threatening weapons types. To try to control the entire spectrum is both unrealistic and unnecessary. Which weapons frustrate the United States' ability to meet its national objectives and its commitments to allies? The weapons that fit this description tend to include the air-delivered and submarine-launched categories. These nuclear warheads are mated to delivery systems that have the ability to reach out over strategic distances, not only directly holding US sovereignty at risk, but also US allies, and US forces engaged in military operations throughout the world. Ironically, these weapons and delivery systems also seem to be the ones the Russians are remanufacturing, upgrading, and modernizing.

According to Dr. Nikolai Sokov, a Russian defense analyst, Russian warhead remanufacturing is concentrated on the following delivery systems: new medium bomber research and development, T-22M Backfire upgrades, air- and sea-based short and long-range cruise missile development, and the *Iskander*, a new tactical ballistic missile.⁷⁵ Due to the nature of these types of weapons, they are also likely to be forward-deployed during times of increased tension. According to Dr. Kay, who was intimately involved in searching for Iraqi WMD concealment and dispersal methods, there are several classic signals that aid in tracking forward deployment of these types of weapons:

- the physical signature of the actual weapon (neutrons emitted by the warhead)
- temporary storage facilities
- specialized security forces
- classic logistical configurations for special weapons support
- SIGINT associated with nuclear security forces
- training and operational patterns
- specialized unit characteristics that are designated as WMD capable⁷⁶

By placing a premium on intelligence gathering and analysis, by concentrating on deployment patterns, and by using all National Technical Methods (NTMs) available to gain information and access about an adversary's WMD programs, the United States can add credibility to overt confidence building and negotiated transparency programs like the Nunn-Lugar program.

Finding #4: The US should enhance deterrence by integrating all nuclear weapons into a comprehensive nuclear posture. The New Logic⁷⁷ of deterrence requires a set of enhanced

capabilities and strategies. No longer does the US have the convenience of carefully plotting a bilateral deterrence relationship with a well-studied and reasonably predictable adversary. The realities of the new global environment demand multi-dimensional deterrence that is postured against primary Tier I threats as well as a multitude of potential Tier II adversaries. More than ever, as Gen. Eugene Habiger, the former CINC of USSTRATCOM indicated, “deterrence is a package of capabilities, encompassing not just numbers or weapons, but an assured retaliatory capability provided by a diversified, dispersed, and survivable force with positive command and control and effective intelligence and warning systems.”⁷⁸ Nuclear weapons serve to signal the “determination to maintain the military capability and willingness to ensure global stability and to frustrate, with speed and decisiveness, those who would attempt to overturn that stability.”⁷⁹ But the threat of nuclear weapons must be made real and credible to ensure that deterrence is robust. The psychological element of nuclear deterrence must be preserved. Jonathan Shell correctly emphasized that “A central lesson of deterrence theory is that the psychological effects of nuclear arms are as important as the physical ones.”

Whether in the Cold War or post-Cold War period, the first step in understanding deterrence is to recognize that it is a psychological function. Confident claims that any particular strategic nuclear balance is “stable,” or that any particular adjustment to that balance will be “stabilizing” or “destabilizing” should be viewed with great skepticism because deterrence, properly understood, involves much more than comparing relative force capabilities. It involves essential questions about decision making factors that typically are ignored in Cold War style “stability analyses.”⁸⁰

Two inextricably linked components—credibility and capability—amplify the psychological nature of deterrence. Both need to be robustly preserved to deter the use of weapons of mass destruction against the United States and its allies.

But how does this relate to those weapons traditionally labeled as “tactical” nuclear weapons and why is this discussion relevant? Because these weapons have political and military value when the US is forced to deter multi-dimensional Tier II threats. A full range of nuclear options, when combined with defensive systems, make multi-dimensional deterrence robust and credible. The capability to respond with a variety of nuclear systems complicates planning in the mind of the adversary and ultimately ensures that Tier II-type challengers continue to face the risk of nuclear retaliation by the United States. Instead of presenting a deterrence strategy that postures *the Triad* for national survival situations and then muddles through the broader range of multi-dimensional WMD threats by obliquely referring to “other nuclear weapons,” the US should field a comprehensive deterrence strategy and parallel force posture incorporating all nuclear weapons without distinction between “tactical” and “strategic” options or systems. The Triad should no longer just represent “strategic” nuclear systems. Instead, the US should field a robust package of nuclear systems—to be postured and deployed across the spectrum of Tier I and II deterrence requirements, as necessary for national security. As previously outlined in this paper, the Cold War vintage distinction between “tactical” and “strategic” may, in the long term, have the unintended consequence of actually weakening deterrence. Diminishing the impact of nuclear weapons by labeling them as “tactical” and not incorporating them as part of the comprehensive nuclear force

posture may very well undermine their fundamental psychological value. Ultimately nuclear weapons are about their inherent potential for rapid and dramatic destruction, shock, and death—regardless of whether they yield one megaton or 20 kilotons. Distinguishing between “strategic” or “tactical” in that sense is more or less academic. As Schelling wrote, their enormous value is in the pure violence that they signal.

NOTES

¹ Comment by Robert McNamara, in David M. Kunsman and Douglas B. Lawson, *A Primer on US Strategic Nuclear Policy*, SAND2001-0053 (Albuquerque, New Mexico: Sandia National Laboratories, January 2001), 44.

² Dr. David Kay, Interview with the authors, Science Applications International Corporation, Washington D.C., May 15, 2001.

³ Dr. Keith Payne, Interview with the Authors, National Institute for Public Policy, Washington D.C., May 22, 2001.

⁴ Dr. John Reichart, Interview with the Authors, National Defense University, Washington D.C., May 23, 2001.

⁵ Dr. Lewis Dunn, Interview with the Authors, Science Applications International Corporation, Washington D.C., May 15, 2001.

⁶ Dr. George Look, Interview with the Authors, Office of Strategy and Threat Reduction/Threat Reduction Policy, Pentagon, Washington D.C., May 10, 2001.

⁷ Dr. Nikolai Sokov, Interview with the Authors, Monterey Institute for International Studies, Monterey, CA, May 1, 2001.

⁸ Testimony by Admiral Richard Mies, Commander-in-Chief, US Strategic Command, Hearing of the Senate Armed Service Committee on US Strategic Nuclear Force Requirements, Washington D.C., 23 May 2000.

⁹ Harald Mueller and Annette Schaper, “Definitions, Types, Missions, Risks and Options for Control: A European Perspective,” in *Tactical Nuclear Weapons: Options for Control* (Geneva: United Nations Institute for Disarmament Research, December 2000), 32-35.

¹⁰ Ibid.

¹¹ Ibid.

-
- ¹² Lester R. Kurtz, *The Nuclear Cage: A Sociology of the Arms Race* (New Jersey: Prentice Hall, 1988), 21-23.
- ¹³ Ibid.
- ¹⁴ Ibid.
- ¹⁵ Thomas C. Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966), 17.
- ¹⁶ Ibid.
- ¹⁷ Robert Joseph, "Nuclear Weapons and Regional Deterrence," in Jeffrey A. Larsen and Kurt J. Klingenger, editors, *Controlling Non-Strategic Nuclear Weapons, Obstacles and Opportunities*, (USAF Academy, CO: Institute for National Security Studies, June 2001), 94.
- ¹⁸ Dr. Keith Payne, Interview with the Authors.
- ¹⁹ See John Cappello, Gwendolyn Hall and Stephen Lambert, "Triad 2025: The Evolution of a New Strategic Force Posture," *National Security Studies Quarterly* VII:2 (Spring 2001): 1-29.
- ²⁰ Ibid.
- ²¹ Dr. David Kay, Interview with the authors.
- ²² Robert Kromer, *New Weapons and NATO* (New York: Greenwood Press, 1987), 41.
- ²³ Nikolai Sokov, "Tactical Nuclear Weapons Elimination: Next Step for Arms Control," *The Nonproliferation Review* (Winter 1997): 20.
- ²⁴ Jeffrey A. Larsen and Kurt J. Klingenger, 6.
- ²⁵ Ibid., 7.
- ²⁶ Inside the Air Force, "Tactical Nuclear Weapons Losing Prominence in Air Force Planning," September 8, 2000, 1, <http://ebird.dtic.mil/Sep2000/s20000908tactical.htm>.
- ²⁷ Linton Brooks, "Diplomatic Solutions to the "Problem" of Non-Strategic Weapons," in Larsen and Klingenger, op. cit., 204.
- ²⁸ Stanley R. Sloan, "NATO Nuclear Strategy Beyond the Cold War," in Larsen and Klingenger, op. cit., 54.
- ²⁹ NATO's Strategic Concept, 1999, Concept #62, in Larsen and Klingenger, op. cit., appendices, 344.
- ³⁰ Ibid., Concept #64, 345.
- ³¹ Andrea Gabbitas, "Non-Strategic Nuclear Weapons: Problems of Definition," in Larsen and Klingenger, op. cit., 31.

-
- ³² Ibid., 28.
- ³³ Linton Brooks, op. cit., 210, (note 2).
- ³⁴ Linton Brooks, op. cit., 211 (note 11).
- ³⁵ Kenneth H. Bacon, ASD PA, DoD News Briefing, October 20, 1999.
- ³⁶ Ibid.
- ³⁷ Ibid.
- ³⁸ Ibid.
- ³⁹ Lewis A. Dunn and Victor Alessi, "Arms Control by Other Means," *Survival* 42:4 (Winter 2000-2001): 140 (note 3).
- ⁴⁰ Michael R. Gordon and David E. Sanger, "Bush Will Offer Nuclear Cuts to Sway Russia," *New York Times*, November 2, 2001, <http://ebird.dtic.mil/Nov2001/e20011102offer.htm>.
- ⁴¹ Alvin Z. Rubinstein, "A US Policy for Russia," Foreign Policy Research Institute, April 25, 2001.
- ⁴² John M. Donnelly and George Lobsenz, "Rumsfeld Wants Review of Threat-Reduction Spending," *Defense Week*, January 16, 2001, 3, <http://ebird.dtic.mil/Jan2001/e20010116rumsfeld.htm>.
- ⁴³ See Gwendolyn M. Hall, John T. Cappello, and Stephen P. Lambert, *A Post-Cold War Nuclear Strategy Model*, INSS Occasional Paper 20 (USAF Academy, CO: Institute for National Security Studies, July 1998), 41; Stephen P. Lambert and David A. Miller, *Russia's Crumbling Tactical Nuclear Weapons Complex: An Opportunity for Arms Control*, INSS Occasional Paper 12 (USAF Academy, CO: Institute for National Security Studies, April 1997), 12-15.
- ⁴⁴ Walter Pincus, "Panel Urges \$30 Billion to Secure Russian Nuclear Arms," *Washington Post*, January 11, 2001, 21, <http://ebird.dtic.mil/Jan2001/e20010111urges.htm>.
- ⁴⁵ John M. Donnelly and George Lobsenz, "Rumsfeld Wants Review of Threat-Reduction Spending," *Defense Week*, January 16, 2001, 3.
- ⁴⁶ Bill Gertz, "Russia Transfers Nuclear Arms to Baltics," *Washington Times*, January 2, 2001, 1; Walter Pincus, "Russia Moving Warheads," *Washington Post*, January 4, 2001, 16; The Associated Press, "A Russian Base in the Baltics is Reported to Have Nuclear Arms," January 4, 2001, <http://www.nytimes.com/2001/01/04/world/04MILI.html>; Nikolai Sokov, "The Tactical Nuclear Weapons Controversy," *Jane's Defence Weekly*, January 31, 2001, <http://ebird.dtic.mil/Jan2001/s20010131tactical.htm>; Barry James,

“Nuclear Arms in a Russian Enclave?” *International Herald Tribune*, February 16, 2001, 1, <http://ebird.dtic.mil/Feb2001/e20010216nuclear.htm>.

⁴⁷ Patrick E. Tyler, “Putin Dismisses US Reports that Russia Shipped Nuclear Weapons for Baltic Fleet,” *The New York Times on the Web*, January 7, 2001, <http://www.nytimes.com/2001/01/07/world/07PUTI.html>.

⁴⁸ Robert Joseph, “Nuclear Weapons and Regional Deterrence,” Larsen and Klingenger, op. cit., 91. Also see Dunn and Alessi, op. cit., 140 (note 3).

⁴⁹ Pavel Felgenhauer, “Do The Terrorists Have Nukes,” *Wall Street Journal*, November 8, 2001, <http://ebird.dtic.mil/Nov2001e20011108nukes.htm>.

⁵⁰ Ibid.

⁵¹ Sonya Yee, “Nuclear Experts Warn of Threat From ‘Dirty Bombs,’” *Christian Science Monitor*, November 5, 2001, <http://ebird.dtic.mil/Nov2001/s20011106nuclear.htm>.

⁵² Dunn and Alessi, op. cit., 135.

⁵³ Ibid., 136.

⁵⁴ David S. Yost, “Russia’s Non-Strategic Nuclear Forces,” Draft of Paper, an earlier version of which was published as a chapter in Larsen and Klingenger, op. cit., 3.

⁵⁵ Ibid.

⁵⁶ Alexei Arbatov cited in Yost, 3-4.

⁵⁷ Igor Sergeyev cited in Yost, 4.

⁵⁸ Ibid.

⁵⁹ Yost, 5-9.

⁶⁰ Robert Joseph, “Nuclear Weapons and Regional Deterrence,” in Larsen and Klingenger, op. cit., 93-94.

⁶¹ Nikolai Sokov, “Tactical Nuclear Weapons Elimination: Next Step for Arms Control,” *The Nonproliferation Review* (Winter 1997): 21.

⁶² Maynard W. Glitman, “US Sub-strategic Nuclear Forces and NATO,” Larsen and Klingenger, op. cit., 71.

⁶³ Ibid.

-
- ⁶⁴ John J. Lumpkin, "Mini-nukes Proposed as Deterrent to Small Aggressors," *Albuquerque Journal*, March 28, 2001, 7, <http://ebird.dtic.mil/Apr2001/s20010402mini.htm>.
- ⁶⁵ *The Washington Post*, "US considers low-yield nuclear weapon," *The Gazette*, April 16, 2001, A3.
- ⁶⁶ William B. Scott, "Will National Security Reviewers Propose a New Nuke?" *Aviation Week and Space Technology*, August 20, 2001, 66, <http://ebird.dtic.mil/Aug2001/s20010821nuke.htm>.
- ⁶⁷ National Institute for Public Policy, *Rationale and Requirements for U.S. Nuclear Forces and Arms Control*, January 2001, 9.
- ⁶⁸ Stephen M. Younger, "Nuclear Weapons in the Twenty-First Century," LAUR-OO-2850, June 27, 2000.
- ⁶⁹ "US Rethink Could Spawn 'Mini-Nukes,'" *Jane's Defence Weekly*, May 23, 2001, <http://ebird.dtic.mil/May2001/s20010523rethink.htm>.
- ⁷⁰ Rear Admiral Eugene Carroll, Jr., USN (Ret), "A New US Nuclear Weapon?" *The Defense Monitor*, Vol XXIX, No. 7, 2000, <http://www.cdi.org/dm/2000/issue7/new-nuclear.html>.
- ⁷¹ Robert Joseph, "Nuclear Weapons and Regional Deterrence," in Larsen and Klingenberg, op. cit, 93-94.
- ⁷² Ibid.
- ⁷³ Robert H. Gromoll and Dunbar Lockwood, "Non-Strategic Nuclear Weapons: Defining Objectives," in Larsen and Klingenberg, op. cit, 81.
- ⁷⁴ Dr. David Yost, Interview with the Authors, Naval Postgraduate School, Monterey, CA, May 1, 2001
- ⁷⁵ Dr. Nikolai Sokov, Interview with the Authors.
- ⁷⁶ Dr. David Kay, Interview with the authors.
- ⁷⁷ For reference, please see John Cappello, Gwendolyn Hall and Stephen Lambert, "Triad 2025: The Evolution of a New Strategic Force Posture."
- ⁷⁸ US Senate, Committee on Armed Services, Statement of General Eugene E. Habiger, March 13, 1997, p.4 (mimeo), in Payne, op. cit., 79.
- ⁷⁹ Dr. David Kay, Interview with the Authors.

⁸⁰ Keith B. Payne, *The Fallacies of Cold War Deterrence and a New Direction* (Lexington, Kentucky: The University Press of Kentucky, 2001), 30.
